Supporting Information

SI Appendix

Each participant received a unique hyperlink leading to an online survey, which included two decision-making tasks—one assessing behavioral distrust and the other assessing behavioral trust. The unique link allowed us to later pair each participant with his or her twin sibling. Note that the survey instrument randomized the task version—either the distrust game or the trust game—that participants saw first. Participants were guided through the games at once. After the completion of the study, we paired each twin participant with another human counterpart. Further details are provided next and in an overview of the experimental protocol in SI Appendix, Fig. S2.

First, participants provided informed consent to a protocol approved by the Institutional Review Board of the University of Arizona. Participants were also told that their choices in the decision-making tasks would have real economic consequences; they would be paired with a counterpart, and the experimenter would determine their winnings based on their own and their counterpart's choices.

Second, participants were provided with the following information:

In this part of the study, you will engage in two different tasks—called the decision task and the choice task—in which you have the opportunity to earn actual money (that the WS twin registry will send you by mail shortly after completion of the study). Although their format may appear similar on first sight, the two tasks have important differences in terms of their instructions and payoff distributions. Thus, please pay close attention to the instructions of both tasks. You are not told who your partners are either during or after the tasks nor are they told who you are.

Third, each participant engaged in both decision-making tasks. The order of presentation of the two tasks was counterbalanced. For the distrust task, participants read the following information:

In this task, a Person X is paired with a Person Y. Some participants are assigned to be Person X, others to be Person Y. Whether you are assuming the role of Person X or Person Y will determine the options available to you in this task.
***You** are chosen to be **Person X**. You will be paired with a Person Y.*

ABOUT THE DECISION

The study is conducted in two stages:

Stage 1
As Person X, you are allocated $0; Person Y is allocated $4. You make the first decision: you can decide how much, out of the money Person Y currently holds, you want to take (up to a maximum of $3). Each amount taken by you is divided by three before you receive it. For example, if you take $0.30 from Person Y, you receive $0.10. You can take any of the following amounts (including zero):
$3, $2.70, $2.40, $2.10, $1.80, $1.50, $1.20, $0.90, $0.60, $0.30, $0.

Stage 2
Person Y then decides how much of the amount s/he holds after Stage 1 to give to you. You will receive exactly the amount of money given by Person Y. For example, if Person Y gives $3, you receive $3.
Person Y can give any amount, in $0.10 increments, equal to or smaller than the amount of money s/he holds after Stage 1 (including zero).

Illustrative example:
In Stage 1, if you decide to take $1.20 from Person Y:
Your payoffs after Stage 1 are $1.20 / 3 = $0.40;
Person Y's payoffs after Stage 1 are $4 - $1.20 = $2.80.
In Stage 2, Person Y can give any amount of money out of his/her $2.80 to you. For example, if Person Y decides to give $0.70:
Your payoffs after Stage 2 are $0.40 + $0.70 = $1.10;
Person Y's payoffs after Stage 2 are $2.80 - $0.70 = $2.10.

THE DETAILS OF THE EXPERIMENT

Conduct of study:
(i) You were chosen to be Person X.
(ii) We start with Stage 1. You decide how much to take from Person Y.
(iii) We continue with Stage 2. Person Y decides how much of the money they hold after Stage 1 to give to you.
(iv) Person Y knows the final outcome; you are informed about the outcome.
(v) We calculate your earnings.

Participants were then shown three examples and asked to respond to several comprehension questions. Next, participants were asked to make their decision:

DECISION FORM

Now that we are done with the instructions and examples, please make your actual decision in the decision task.

Stage 1:
As Person X, how much money (if any) do you take from Person Y? Please choose one:

- I take $3.00 → My payoffs after Stage 1: $1.00; Y's payoffs after Stage 1: $1.00
- I take $2.70 → My payoffs after Stage 1: $0.90; Y's payoffs after Stage 1: $1.30
- I take $2.40 → My payoffs after Stage 1: $0.80; Y's payoffs after Stage 1: $1.60
- I take $2.10 → My payoffs after Stage 1: $0.70; Y's payoffs after Stage 1: $1.90
- I take $1.80 → My payoffs after Stage 1: $0.60; Y's payoffs after Stage 1: $2.20
- I take $1.50 → My payoffs after Stage 1: $0.50; Y's payoffs after Stage 1: $2.50
- I take $1.20 → My payoffs after Stage 1: $0.40; Y's payoffs after Stage 1: $2.80
- I take $0.90 → My payoffs after Stage 1: $0.30; Y's payoffs after Stage 1: $3.10
- I take $0.60 → My payoffs after Stage 1: $0.20; Y's payoffs after Stage 1: $3.40
- I take $0.30 → My payoffs after Stage 1: $0.10; Y's payoffs after Stage 1: $3.70
- I take $0.00 → My payoffs after Stage 1: $0.00; Y's payoffs after Stage 1: $4.00

Similarly, for the trust game, participants read the following information:

In this task, a Person A is paired with a Person B. Some participants are assigned to be Person A, others to be Person B. Whether you are assuming the role of Person A or Person B will determine the options available to you in this task.
***You** are chosen to be **Person A**. You will be paired with a Person B.*

ABOUT THE DECISION

The study is conducted in two stages:

Stage 1
As Person A, you are allocated $1; Person B is allocated $1.
You make the first decision: you can decide how much out of $1 you currently hold, you want to send to Person B. Each amount sent by you is multiplied by three before Person B receives it. For example, if you send $0.10, Person B receives $0.30.
You can send any of the following amounts (including zero):
$0, $0.10, $0.20, $0.30, $0.40, $0.50, $0.60, $0.70, $0.80, $0.90, $1.

Stage 2
Person B then decides how much of the amount s/he holds after Stage 1 to give to you. You will receive exactly the amount of money given by Person B. For example, if Person B gives $0.30, you receive $0.30.

Person B can give any amount, in $0.10 increments, equal to or smaller than the amount of money s/he holds after Stage 1 (including zero).

Illustrative example:
In Stage 1, if you decide to send $0.60 to Person B:
Your payoffs after Stage 1 are $1 - $0.60 = $0.40;
Person B's payoffs after Stage 1 are $1 + ($0.60 x 3) = $2.80.
In Stage 2, Person B can give any amount of money out of his/her $2.80 to you. For example, if Person B decides to give $0.70:
Your payoffs after Stage 2 are $0.40 + $0.70 = $1.10;
Person B's payoffs after Stage 2 are $2.80 - $0.70 = $2.10.

THE DETAILS OF THE EXPERIMENT

Conduct of study:
(i) You were chosen to be Person A.
(ii) We start with Stage 1. You decide how much to send to Person B.
(iii) We continue with Stage 2. Person B decides how much of the money they hold after Stage 1 to give to you.
(iv) Person B knows the final outcome; you are informed about the outcome.
(v) We calculate your earnings.

Participants were then shown three examples and asked to respond to several comprehension questions. Next, participants were asked to make their decision:

DECISION FORM

Now that we are done with the instructions and examples, please make your actual decision in the choice task.

Stage 1:

As Person A, how much money (if any) do you send to Person B? Please choose one:

- I send $0.00 → My payoffs after Stage 1: $1.00; B's payoffs after Stage 1: $1.00
- I send $0.10 → My payoffs after Stage 1: $0.90; B's payoffs after Stage 1: $1.30
- I send $0.20 → My payoffs after Stage 1: $0.80; B's payoffs after Stage 1: $1.60
- I send $0.30 → My payoffs after Stage 1: $0.70; B's payoffs after Stage 1: $1.90
- I send $0.40 → My payoffs after Stage 1: $0.60; B's payoffs after Stage 1: $2.20
- I send $0.50 → My payoffs after Stage 1: $0.50; B's payoffs after Stage 1: $2.50
- I send $0.60 → My payoffs after Stage 1: $0.40; B's payoffs after Stage 1: $2.80
- I send $0.70 → My payoffs after Stage 1: $0.30; B's payoffs after Stage 1: $3.10
- I send $0.80 → My payoffs after Stage 1: $0.20; B's payoffs after Stage 1: $3.40
- I send $0.90 → My payoffs after Stage 1: $0.10; B's payoffs after Stage 1: $3.70
- I send $1.00 → My payoffs after Stage 1: $0.00; B's payoffs after Stage 1: $4.00

The behavioral choices on the two tasks' "Decision Forms" were used to construct distrust and trust scores, coded as integer values between 1 and 11 in such a way that greater values indicate higher distrust and higher trust, respectively. In line with prior research following a behavioral approach (e.g., 1, 2), these scores were used as proxies for individuals' distrust and trust dispositions.

Fourth, after responding to the online survey, participants were debriefed and told that the purpose of the research was to investigate commonalities and differences of social preferences in twins. Participants were also asked to refrain from showing the debriefing sheet or discussing any aspect of the study with their twin sibling.

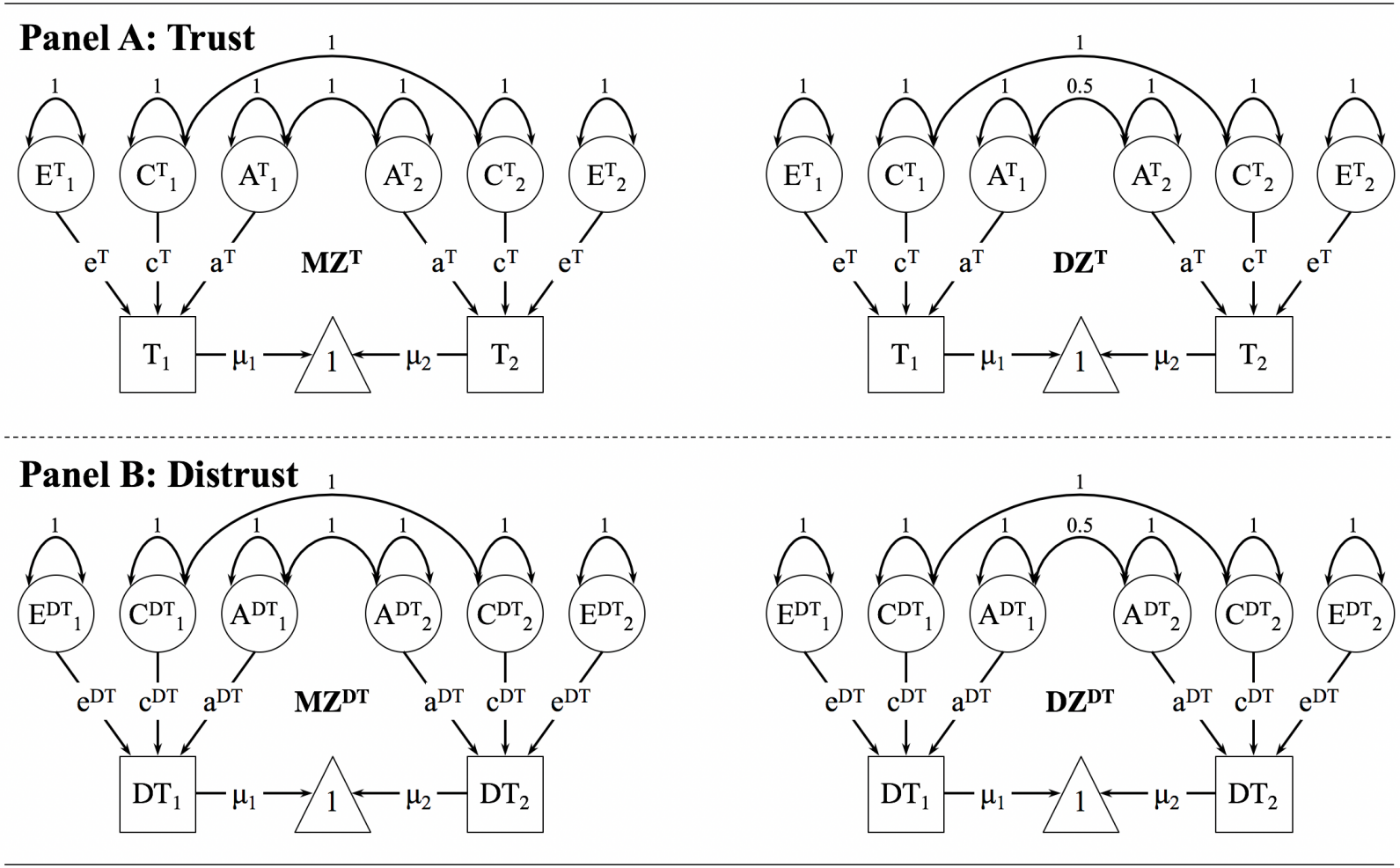
Fifth and finally, after the completion of the data collection, we paired each twin participant with another human counterpart in order to determine the twin participants' payouts. The counterpart players were recruited through the online panel of Amazon Mechanical Turk, an online crowdsourcing service offering large volumes of small web-based tasks to anonymous online workers. Based on each twin participant's monetary choice, we presented counterpart players with the same two decision-making tasks, the only difference being that the counterpart players engaged in stage 2 of the task. For

example, in the distrust task, we told counterpart player that *Person X has decided to take the following amount from you: Person X took $0.00 → X's payoffs after Stage 1: $0.00; Your payoffs after Stage 1: $4.00*. Based on this information, we asked the counterpart player how much money (if any), between $0 and $4 (in 10-cent increments), he or she would give to Person X. The counterpart player's final decision determined the actual payout amount that was then paid out to each twin participant by the WSTR. The counterpart players also received the corresponding dollar amount.

References in Supporting Information

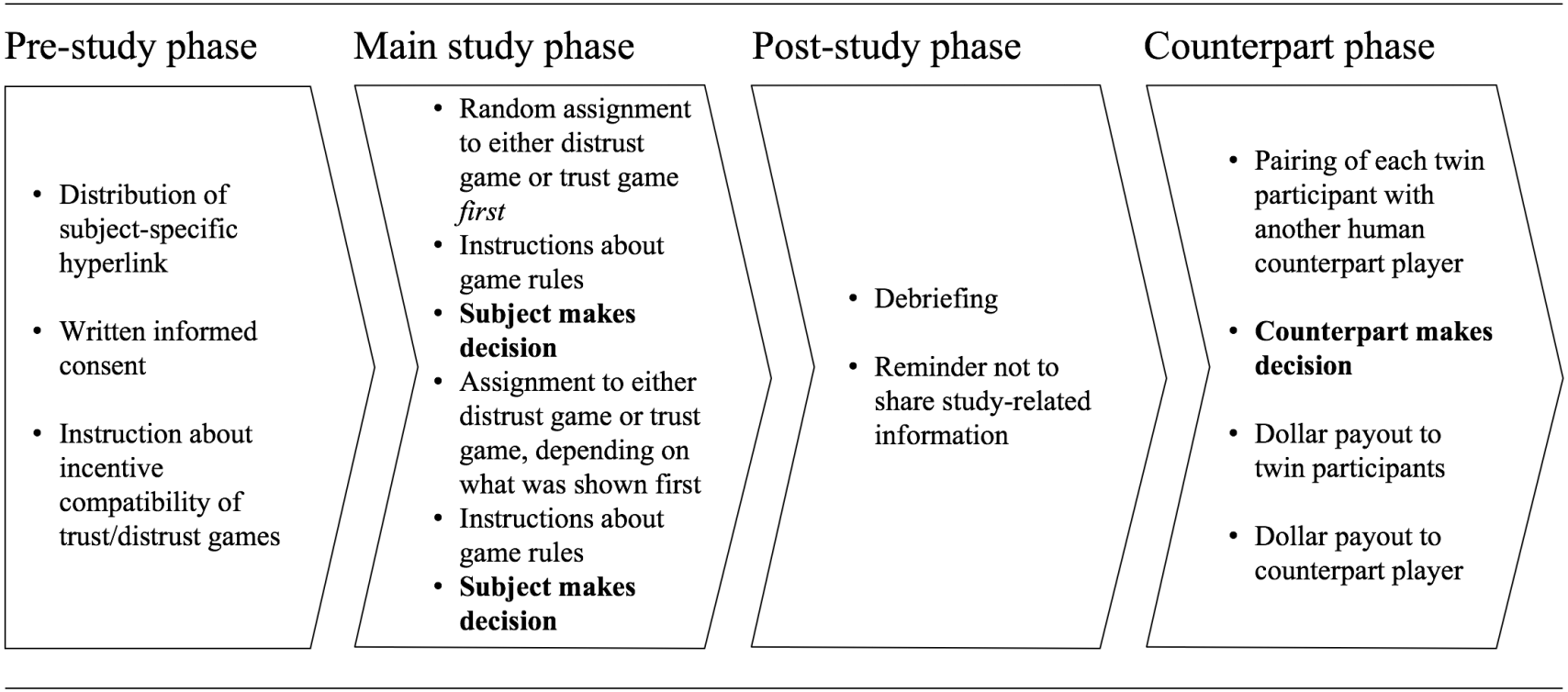
1. Cesarini D*, et al.* (2008) Heritability of cooperative behavior in the trust game. *Proc Natl Acad Sci USA* 105:3721-3726.
2. Yamagishi T*, et al.* (2012) Rejection of unfair offers in the ultimatum game is no evidence of strong reciprocity. *Proc Natl Acad Sci USA* 109:20364-20368.

SI Appendix, Fig. S1: Model specification



Note. MZ: monozygotic twins; DZ: dizygotic twins; T: Trust; DT: Distrust.

SI Appendix, Fig. S2: Experimental protocol



SI Appendix, Table S1: Heritability of distrust and trust – with covariates for race (whites) and age (in years) included

	Mean estimated proportions of total variance		
Model	**a^2** (contribution of heritability)	**c^2** (contribution of shared environment)	**e^2** (contribution of unshared environment)
Distrust			
ACE	0.00	0.18	0.82
AE	0.20	-	0.80
CE	-	0.18	0.82
E	-	-	1.00
Trust			
ACE	0.28	0.00	0.72
AE	0.28	-	0.72
CE	-	0.22	0.78
E	-	-	1.00

Note. To further explore the robustness of the results, we reran the models while including covariates for race (dummy-coded as 1 if whites, 0 otherwise) and age (in years). Results were not notably different from those that did not include the covariates (see Table 3).